US Army Corps of Engineers®
Engineer Research and Development Center

Tidal Datum for Dredging

Objective

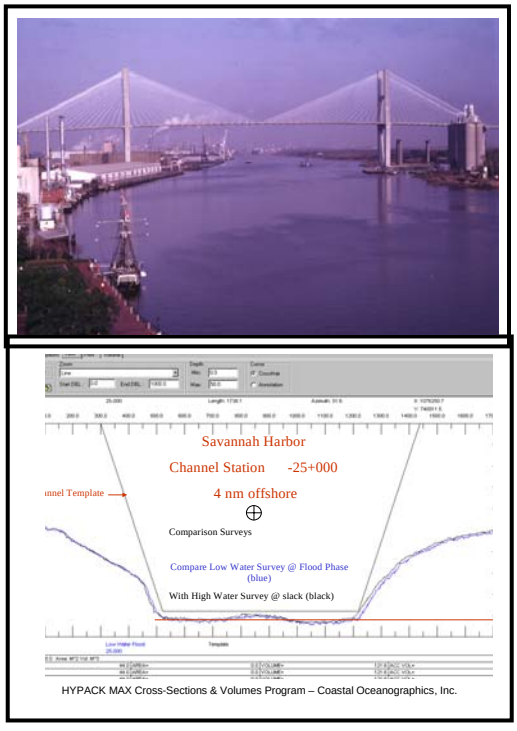
Develop tidal and river datums in approach channels, harbors, and upland rivers using GPS in support of the U.S. Army Corps of Engineers (USACE) Navigation Mission.

Background

Tidal datums, or models of tide behavior across a specific body of water, are normally based on a time series of gauge measurements recorded at fixed structures along a waterway. Where fixed platforms are not available, such as channel approaches to harbors or the middle of bays and estuaries, uncertainty exists for the exact tide from minute to minute and wind effects to the water levels. However, the development of Real Time Kinematic (RTK) GPS, which provides high accuracy in three dimensions, enables tide measurements on vessels, which results in more accurate vertical locations for dredging or navigation.

Description

A plan for the GPS Water Level System is developed by combining historic conventional tide gauge information with locations selected for GPS tidal measurements. Once executed, measurements are taken every second, twenty-four hours per day, seven days a week, for one month at each required location. The information is compiled and verified by the National Oceanic and Atmospheric Administration (NOAA). The model is then created and stored in the vessel computer to be used during survey or dredging operations.



HYPACK MAX Cross-Sections & Volumes Program – Coastal Oceanographics, Inc.

Benefits

During survey or dredge operations using GPS Water Levels, only the vessel personnel are needed, no shoreline support personnel are required for tide staff reading. Start the vessel, go to the project, and begin operations immediately with tide information available every second on the vessel's actual location. This alone saves at least $200,000 per year per District for floating plant and personnel costs incurred by in-house and dredge contractor hydrographic surveys. Eliminated dredging disputes saves far more than this figure depending on the project.

Hydrographic surveys are repeatable time after time for both contractors and government survey vessels using this new system. Dredged volumes between government and contractor surveys match within one percent, saving millions of dollars for USACE Districts and dredge contractors annually. Dredges can also use this system to ensure the proper channel clearance is dredged and verified at the same time.

Current Status

The USACE Districts currently using the GPS Water Level System are Jacksonville, Savannah, Charleston, and Wilmington. The system has been a success for over five years.

Point of Contact

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